



Super head+R Instruction Manual for CYLINDER HEAD Kit

Item No. : 01-03-8104
Compatible engines : 1P60-FMJ
: 1P60-5FMJ
: ZS1P50-YMJ

- Thank you for purchasing one of our TAKEGAWA products. Please strictly follow the instructions to install and use the kit.
 - Before installing the kit, please be sure to check the kit contents. If you have any questions about the kit, please contact your local TAKEGAWA dealer.
- © Please note: Illustrations and photos may vary from actual hardware.

~ Features ~

TAKEGAWA Super Head +R is compatible with the above "Compatible (Chinese) engines". It is easy to install, only replace the cylinder head. Both diameters of intake and exhaust valve are designed larger than those of the stock cylinder head (IN ϕ 28.5 $\rightarrow$ ϕ 30, EX ϕ 23 $\rightarrow$ ϕ 24.5). Roller bearings are utilized at the shovel portion of valve rocker arms. Rocker arm body is forged aluminum. It offsets the increased weight with roller bearings. As the result, all the functions make it possible to provide higher output power in high rpm range. S-15D camshaft (including the specialized decompression adapter), gaskets, cylinder head cover, two types of intake manifolds (air from forward or backward, and compatible with PE28 and VM26) are included. In addition, manifold can be installed at various set angles in the area without interference of the frame using the included manifold adapter.

Please read the following before the installation.

- © We shall be held free and harmless from any and all liabilities or claims for any accidents or damages whatsoever arising from the use of this product not in conformity with the instructions in this manual.
- © NOTE : This product is compatible with above "Compatible engines" ONLY. Other engines are NOT available.
- © The service and repair information contained in this manual is intended for use by whom are qualified and have basic skills and knowledge. Any person who attempts service or repairs without the proper experiences, tools and equipment are highly recommended to ask speciality shops or professional mechanics.
- © We shall be held free from any kind of warranty whatsoever of products other than this product if any defect takes place on the other products than this one after the installation and use of this product.
- © TAKEGAWA Co., Ltd. does not accept returns and/or repairs on any parts which have been modified and/or installed on a vehicle.
- © We do not have any information or service data on the combination of our products and other manufacturer's products.
- © The serial No. is stamped on the cylinder head. This No. is occasionally required when ordering the parts.
- © Some of the bolts and nuts are reused. If they are excessive wore or damaged, always use the new ones.
- © DO NOT use liquid seals which may jam the oil passages. It causes the engine damage in the worst case.
- © Always use high-octane gasoline ONLY.
NOTE: If the regular gasoline remains in the fuel tank, be sure to replace it with the high-octane gasoline.
- © Determine the heat value of a spark plug depending on your setting.
- © Use stock ignition system ONLY. We do NOT have any data of the combination of other manufacture's products.
Never combine this product with other than stock ignitions. It may cause the problems.
- © Installing oil cooler is highly recommended.
- © We recommend an engine oil which is API SP class or higher such as SAE 10W-40 / 15W-50 or equivalent.
- © Change the gearing into the suitable one to meet the power or specs.
- © This kit is compatible with only the engine parts we recommend. Please use our recommended engine parts.
- © This product is intended for use ONLY in closed course racing.

Quick starting and sudden acceleration

Idling, sudden acceleration, and sudden engine braking will put a heavy load on the engine, which may result in crank shaft damage and engine breakage in the worst case.



Caution

The following show the envisioned possibility of injuries to human bodies and property damage as a result of disregarding the following cautions.

- This product is intended for use ONLY in closed course racing.
- Do the work only when the engine and muffler are cold at below 35 degrees C to avoid burns.
- Prepare appropriate tools and work properly to avoid the breakage of parts or injuries.
- As some products and frames have sharp edges or protruding portions, please work with your hands protected to avoid injuries.
- Always use new gaskets and seals. (Worn or damaged parts may cause engine troubles.)

Warning The following show the envisioned possibility of human death or serious injuries to human bodies as a result of disregarding the following cautions.

- Those who are technically unskilled or inexperienced are required not to do the work.
(Improper installation due to unskilled technique or lack of knowledge could lead to parts breakage and consequently to accidents.)
- Before working, place the motorcycle on level ground to stabilize its position for safety to avoid the motorcycle overturning.
- Always start the engine in a well-ventilated place, and do not turn the engine on in an airtight place.
(Otherwise, you will suffer from carbon monoxide poisoning.)
- As gasoline is highly flammable, never place it close to fire. Make sure that nothing flammable is near the gasoline. (It may cause a fire.)
- Always use a torque wrench to tighten bolts and nuts securely to the specified torque to avoid these parts getting damaged or loose.
- Never use the parts unspecified by us. (This may lead to parts breakage and consequent accidents.)
- If you find damaged parts when inspecting or performing maintenance of your motorcycle, do not use these parts, and replace them with new ones.
(The continued use of these damaged parts could lead to accidents.)
- When you notice something abnormal with your motorcycle, stop riding immediately and park your motorcycle in a safe place to avoid an accident.
- Before riding, always check such parts as screws for loose.
If you find loose ones, screw them securely up to the specified torque to avoid parts coming off.
- Check or carry out maintenance of parts correctly according to the procedures in the instruction manual or a service manual.
(Improper checking or maintenance could lead to accidents.)
- Fuel must be high-octane gasoline. (Otherwise, troubles such as engine knocking may cause accidents.)

◎ Please be informed that, mainly because of improvement in performance, design changes, and cost increase, the product specifications and prices are subject to change without prior notice.

◎ This instruction manual should be retained for future reference.

● Cautions before riding:

① About fuel:

Whenever regular gasoline is remaining in the fuel tank, always replace it with high-octane gasoline.

② Change of a sprocket:

- ◇ The installation of this product will increase the power of your vehicle.
So use of a normal sprocket will result in severe wears of parts because of too low gear, not only adversely affecting the engine life, but also breaking the engine in the worst case. Please replace the sprocket with the high-geared one.

● Others:

Oil cooler:

- ◇ The installation of this product increases the heat release value of the engine, set off by the increase in power. For a long-time high-load running, we recommend you to install an oil cooler kit which keeps oil at appropriate temperatures and prevents such troubles as oil film shortage at high temperatures.

Carburetor manifold:

- ◇ This kit has two types of intake manifolds(facing forward and backward, and compatible with PE28 and VM26) and a manifold adapter, which makes it possible to install the manifold at the various angles in the area without interference of the frames.

Both surfaces of manifold adapter has mounting threaded bores with different angles to install manifold.

There are also two mounting holes to install the manifold adapter on the cylinder head.

Furthermore, for easy to recognize the point to mount, there are marks on mounting surface, mounting holes of cylinder head and mounting holes of manifold.

- ※ Carburetor and insulator are NOT included. (Purchase our applicable insulators for each carburetor models.)

● About cam shaft

- ◇ There are several kinds of camshaft profiles to meet your riding purpose.
You can choose other optional camshafts other than the included camshaft in the kit.

● About exhaust system

- ◇ For 1P60-FMJ and 1P60-5FMJ, the diameter of the exhaust flange bolt and the mounting angle are different from those of stock.

● Upper limit of revolutions:

- ◇ Redline of rpm is set by each camshaft grade.
Be sure to install tachometer and keep the proper rpm.
- ◇ Take note that idling and sudden acceleration in the 1st and the 2nd gears particularly tend to exceed the upper limit of revolutions. Over revolutions will result in nonsmooth revolutions of the engine, not only adversely affecting the engine life, but also breaking the engine in the worst case.

● Optional valve spring retainer

- ◇ There is an optional titanium valve spring retainer for this Super Head which is 30% lighter than steel retainer.
The surface is treated with a special coating whose hardness is HV1000 above for added shock-resistance and wear-resistance.
Part No. 01-12-084 (with 2 pieces)



- A Head No. (Serial No.) is stamped on cylinder head as identification.

You might need this head No. when ordering this repair part. If you cannot place an order because the repair part No. is unknown, please place an order like below.

- ☆ Make a note of the number stamped on the left side of the cylinder head.

Head No.: KL1-00001

Example of ordering → Super Head Kit, repair part

Head No.: KL1-00001 → Intake valve

Qty:1



- Engine parts of our recommendation:

※ This kit is compatible only with the engine parts of our recommendations. Therefore, please replace those parts not recommended by us with those parts of our recommendations.

Recommended Part		
Clutch	Heavy-duty clutch kit	02-01-0008
Carburetor	Keihin PE28 carburetor	03-03-027
	Mikuni VM26 carburetor	03-03-0321

※ To install the carburetor on the included manifold in the kit, you need a compatible rubber insulator with above carburetor.

(Rubber insulator for Keihin PE28 carburetor:00-03-0211, Rubber insulator for Mikuni VM26 carburetor:00-03-0210)

- About optional cam shaft

- Optional camshafts which can be installed with this kit are available.

Choose the camshaft to meet your riding style referring to the below diagram and enjoy riding.

S-15D cam shaft	01-08-0119	Included in the kit
S-20D cam shaft	01-08-0120	Optional
S-25D cam shaft	01-08-0121	Optional

- About the descriptions of camshafts

The bigger the camshaft number of XX/YY is, the wider the duration is. It means to provide higher output power in high range.

While the smaller their numbers are, the narrower the duration is.

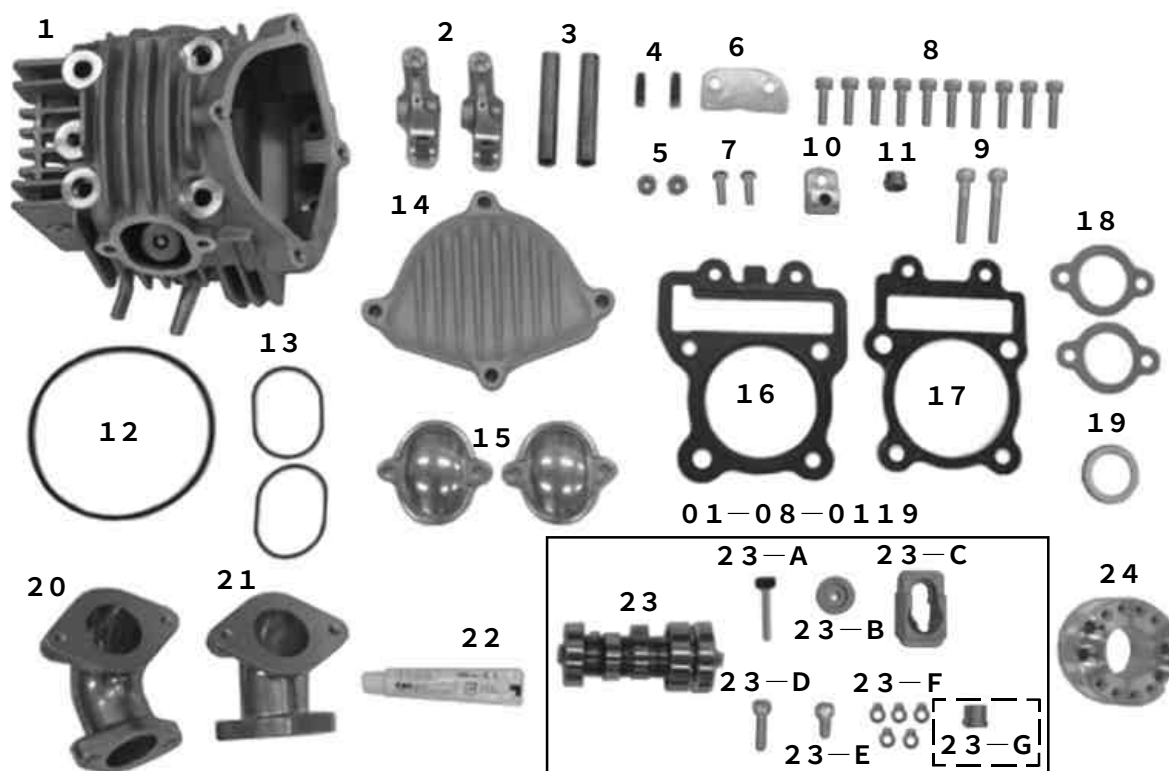
It means the output power is provided more in low to mid ranges.

Our kit includes the selected camshaft for each displacement.

Please choose a suitable camshaft for your riding purpose referring to the camshaft data chart when you purchase our optional camshaft.

Additionally, be careful the engine output power will be changed with specs such as exhaust systems, inlet pipe length, carburetor diameter, compression ratio, ignition system, ignition timing, octane value or with natural phenomenon such as ambient temperature or atmospheric pressure.

~ Kit Contents ~



No.	Part Name	Qty	Repair Part No.	In packs of
1	Cylinder head sub ASSY. ※1	1	06120-KL1-T00	1
2	Rocker arm COMP.	2	14431-SPH-T01	1
3	Rocker arm shaft	2	00-01-0248	1
4	Valve adjust screw	2	00-01-0250	1
5	Valve adjust lock nut	2	00-01-0251	1
6	Cam stopper plate	1	12211-KL1-T00	1
7	Button head socket screw, 6x15	2	00-00-0132	4
8	Socket cap screw, 6x20	10	00-00-0043	10
9	Socket cap screw, 6x35	2	00-00-0259	4
10	Decomp guide	1	14109-YXE-T00	1
11	Decomp collar 2	1	14106-YXE-T00	1
12	O-ring 91x2.5	1	00-01-0252	1
13	O-ring	2	00-01-0253	1
14	Cam shaft cover	1	00-01-0249	1
15	Valve adjusting cap	2	00-01-0247	1
16	Cylinder head gasket	1	12251-KLX-T00	1
17	Cylinder gasket	1	12191-KL1-T00	1
18	Inlet pipe gasket	2	00-03-0007	2
19	Exhaust pipe gasket	1	00-01-0035	1
20	Intake manifold (C-3)	1	17112-KL1-T00	1
21	Intake manifold (K-1)	1	17111-KSH-T00	1
22	Alumi Special (5 g)	1	00-01-0001	1
23	Cam shaft COMP. (S-15D)	1	14100-KL4-T10	1
23-A	Thumb screw 3X28	1	00-01-0254	2
23-B	Plate	1	14104-KL3-T00	1
23-C	Weight	1	14103-KL3-T00	1
23-D	Socket cap screw, 6x20	1	00-00-0043	10
23-E	Socket cap screw, 6x12	1	00-00-0116	6
23-F	Snap ring 6mm	5	00-01-0255	5
23-G	Decomp collar 1 (Does Not use)	1		
24	Manifold adapter	1	17119-KL1-T00	1

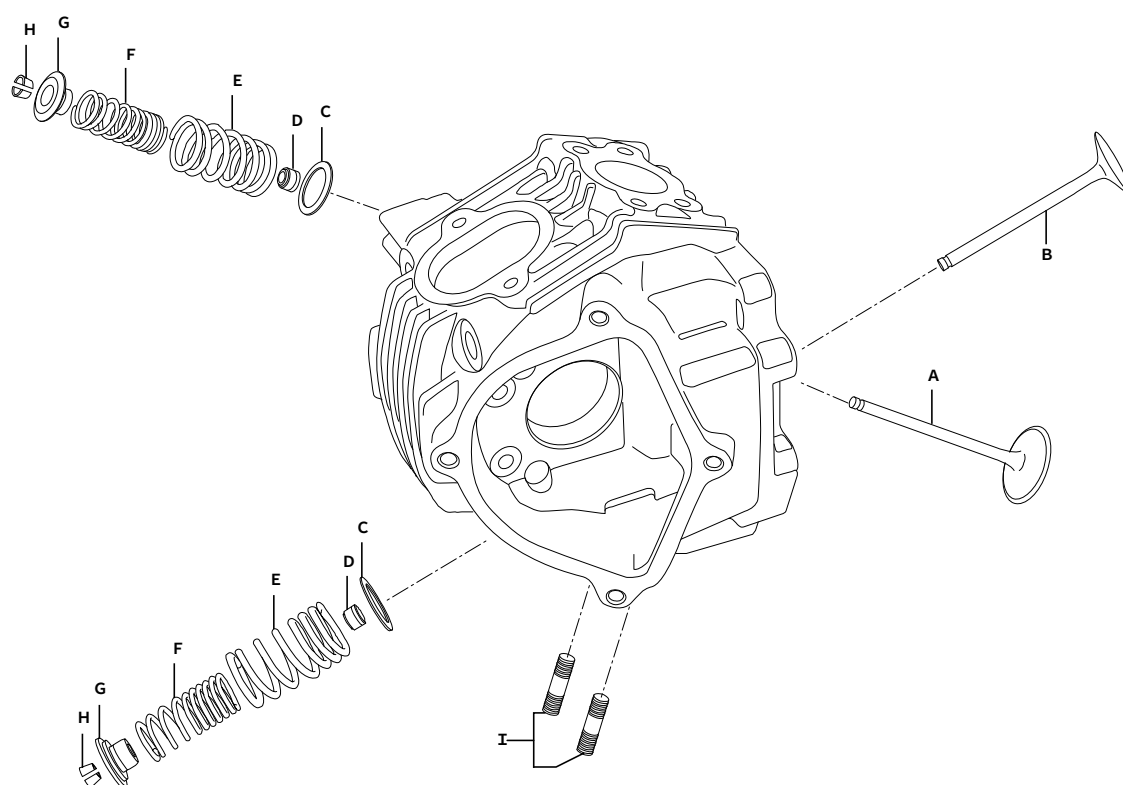
※ 1 See the next page about inner parts assembly and repair parts.

∴ Please order repair parts with the Repair Part Item No.

Without the repair part item No., we may not be able to provide the correct parts.

Some parts are only available as a set. Please order them with the set number.

~ Cylinder Head Assembly and repair parts ~



No.	Part Name	Qty	Repair Part No.	In packs of
A	Intake valve	1	14711-KL1-T01-F	1
B	Exhaust valve	1	14721-KL1-T01-F	1
C	Valve spring outer seat	2	00-01-0002	2
D	Valve stem seal	2	00-01-0015	2
E	Valve spring outer	2	01-12-0106 (SET)	2
F	Valve spring inner	2		2
G	Valve spring retainer	2	00-01-0078	2
H	Valve cotter	4	00-01-0018	4
I	Stud bolt	2	00-01-0136	2

Over-sized valve guide for repair		In packs of
00-01-0006	Valve guide O / S	1

※Please order repair parts with the Repair Part Item No. Without the repair part item No., we may not be able to provide the correct parts.
Some parts are only available as a set. Please order them with the set number.

SPECIAL PARTS TAKEGAWA Co.,Ltd.

3-5-16 Nishikiorihigashi Tondabayashi Osaka Japan

TEL : 81-721-25-1357 FAX : 81-721-24-5059

URL : <http://www.takegawa.co.jp>

~ Cylinder Head Installation Procedures ~

- Remove the cylinder head and cam chain tensioner from the engine.
- Apply an engine oil to the valve adjust screw and install it on the rocker arm.



- Attach the rocker arm to the super head. Put the rocker arm for the intake into the tappet hole on the exhaust side of the super head. And fix the rocker arm shaft after applying molybdenum solution to it. And attach the rocker arm for the exhaust by the same token.

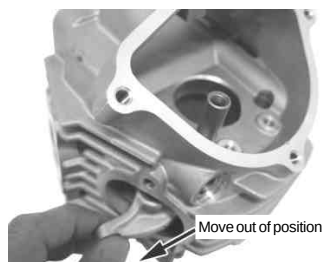


- Fix the special cam shaft. Apply engine oil to the bearing.



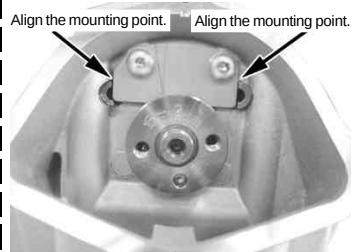
- Pull out the rocker arm shaft on the intake side. And Move the rocker arm on the intake side out of place toward the tappet hole and attach a special cam shaft to the cylinder head. And attach the rocker arm on the intake side and rocker arm shaft. At this point, set the position of the camshaft tops for both intake and exhaust so they face toward the combustion chamber.

(∴ As the bearings of the cam shaft and rocker arm interfere with each other, it is necessary to move the rocker arm out of position and attach the cam shaft.)

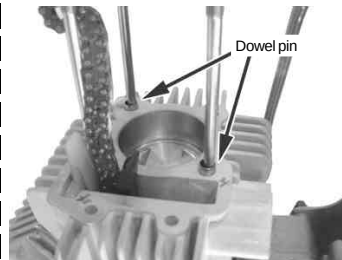


- Install the included cam stopper plate using two button head socket screws (6x15). Align both sides of the cam stopper and the notch of rocker arm shaft. Then tighten the screws to the specified torque.

⚠ Caution: Keep the specified torque.
T=8 N • m (0.8 kgf • m)

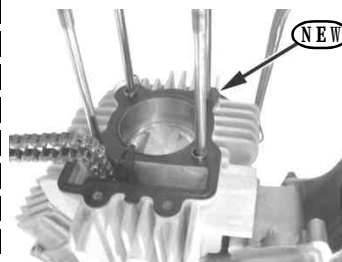


- Set the dowel pin in the dowel pin hole on the cylinder.



- Degrease well the upper surface of the cylinder.

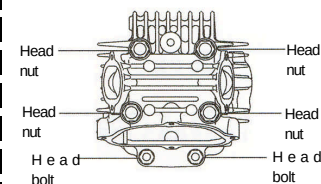
- Attach a cylinder head gasket of the kit to the cylinder.



- Setting the piston to be at top dead center, attach the cylinder head.



- Slightly apply Alumi Special, the heat-resistant lubricating agent, to threaded portions of the cylinder head stud and head bolt, and loosely tighten the head nut and head bolt.



- Tighten 4 head nuts and 2 head bolts diagonally in a few steps to the specified torque in the order indicated in the figure below.

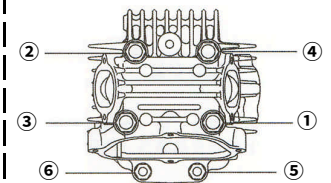
⚠ Caution: Keep the specified torque.

For head bolt:

T=12 N • m (1.2 kgf • m)

For head nut:

T=22N • m (2.2 kgf • m)



- Reinstall the oil pipe in the same way as it was installed, and tighten the banjo bolt to the specified torque.

⚠ Caution: Keep the specified torque.

T=15N • m (1.5 kgf • m)

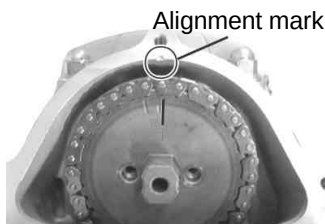
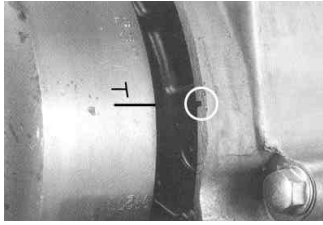


- Fix the bolt which is to clamp the oil pipe, and tighten it.

⚠ Caution: Keep the specified torque.

T=5.2N • m (0.53kgf • m)

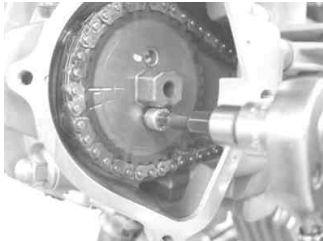
- Attach the cam chain to the cam sprocket. When the "T" mark on the flywheel is aligned with the alignment mark on the crankcase, align the alignment mark on the cam sprocket with the alignment mark on the cylinder head.



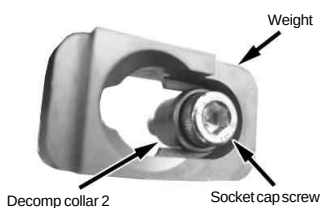
- Fasten and tighten the 6x12 socket cap screw on the exhaust side of the cam sprocket to the specified torque.

△NOTE: Keep the specified torque.

Torque: 12 N · m (1.2 kgf · m)



- Put the socket cap screw (6x20) into the decomp collar 2, and attach them into the weight.

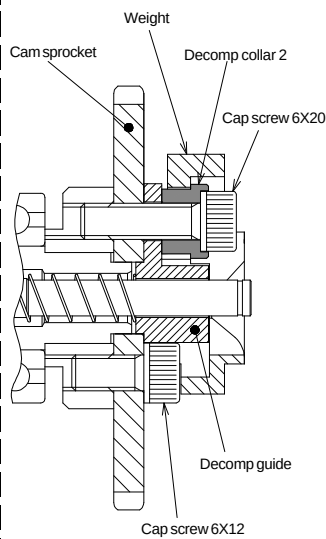


※ Use the shorter collar.

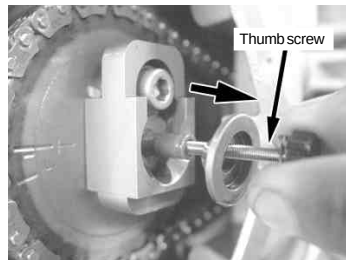
- Install the decomp guide, weight, and then decomp collar 2 in sequence referring to the diagram. Then tighten them to the specified torque.

△NOTE: Keep the specified torque.

Torque: 12 N · m (1.2 kgf · m)



- Put a 6mm snap ring and a plate through the supplied 3x28 thumb screw and attach them to the tip of the shaft that is included in the camshaft COMP. And pull them toward you.



- Attach the snap ring in the shaft groove.

△NOTE: Do not expand the snap ring more than necessary.

△WARNING: Always use a NEW snap ring, and be sure NOT to reuse it.

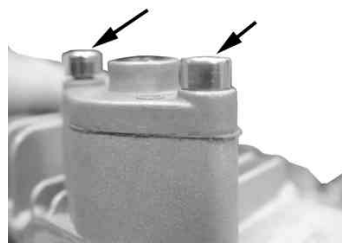


- Remove the cap bolt and spring from the cam chain tensioner, and make sure that the pushrod does not protrude.

- Install the cam shaft chain tensioner with two socket cap screws, and tighten them to the specified torque.

△Caution: Keep the specified torque.

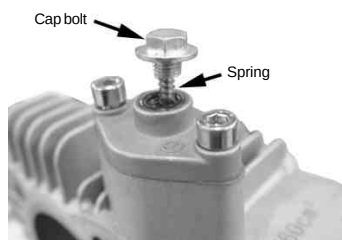
T=5.2 N · m (0.53 kgf · m)



- Install the spring, and then cap bolt in sequence on the cam chain tensioner. Then tighten them to the specified torque.

△Caution: Keep the specified torque.

T=5.2 N · m (0.53 kgf · m)



- Check that the "T" mark on the flywheel is aligned with the "T" mark on the cam sprocket.

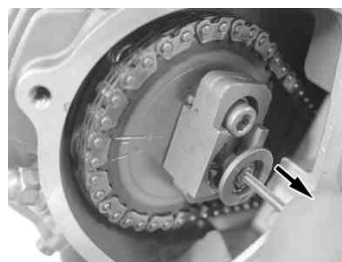
- Adjust the valve clearance with an adjusting screw.

IN: 0.05 ~ 0.08 (When cold.)

EX: 0.05 ~ 0.08 (When cold.)



※ When adjusting the valve clearance, leave the shaft, supplied in the camshaft COMP., pulled toward you lest the decompression device operate on the exhaust side.



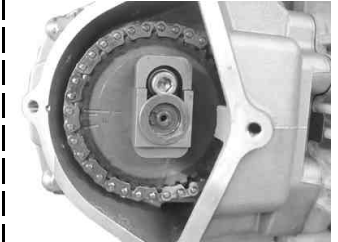
- Tighten the adjusting nut to the specified torque.

△Caution: Keep the specified torque.

T=8.8 N · m (0.9 kgf · m)



- Unscrew the thumb screw.



- Give the crank shaft two turns counterclockwise to check if the valve clearance changes. In case it changes, adjust the clearance until it meets the specification.

- Apply engine oil slightly to an O-ring on the cam shaft cover, and fasten the sprocket cover to the cylinder head with four socket cap screws to the specified torque.

△Caution: Keep the specified torque.

T=5.2 N · m (0.53 kgf · m)



- Apply engine oil slightly to an O-ring on the valve adjusting cap, and fix the valve adjusting cap with two socket cap screws to the specified torque.

△Caution: Keep the specified torque.

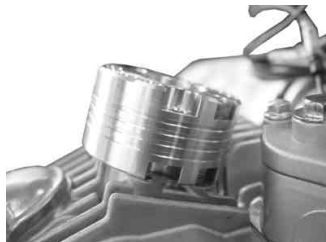
T=5.2 N · m (0.53 kgf · m)



○ Install the cylinder head, inlet pipe gasket, and then manifold adapter in sequence using socket cap screws(6x35).

⚠Caution: Keep the specified torque.

T=10 N • m (1.0 kgf • m)



※ Use the manifold adapter as necessary.

If you do not use the adapter, install the manifold with the inlet pipe gasket using the socket cap screws(6x20).

○ Choose the manifold you use and determine the mounting position. Then install the manifold on the manifold adapter putting the inlet pipe gasket between them using the socket cap screws(6x20).

⚠Caution: Keep the specified torque.

T=10 N • m (1.0 kgf • m)

※ If the manifold interferes with the frame after installing the manifold adapter, the mounting surface of manifold adapter to fix the cylinder head can be ground to meet your desired size.

☆ Engine Starting ☆

○ Make sure that the ignition and the fuel cock are turning off.

○ Continue kicking the starter for a while to circulate the engine oil throughout the engine.

○ Fix a spark plug.
Slightly apply Alumi Special, heat-resistant lubricating agent, to the threaded portion of the plug, and fasten the plug tightly.

⚠Caution: Keep the specified torque.

○ Attach the plug cap to the spark plug.

○ Wipe out thoroughly the dirt and dust on the engine.

○ Turn on the gasoline cock and ignition to start the engine.

⚠Warning: Be sure to start the engine in a well-ventilated place.

○ See if there is anything wrong including strange sounds.

○ If nothing wrong is detected, do the running-in of about 30 to 50 km, and then recheck the valve clearance.

⚠Caution: Do the valve clearance rechecking only when the engine and muffler are cold.

○ Do the running-in again of 100 to 150 km.

○ After the running-in, see if there is nothing wrong like strange sounds or blow-by gas.

If something wrong is found, disassemble the engine again to check every part of it.

⚠Warning: Never reuse the unusable parts.

Owner's Manual

WARNING

Since this cylinder head manual is prepared for those who have acquired basic skills and knowledge in tuning, those who are technically unskilled or inexperienced are not recommended to do the work.

- After the disassembly of the hardware and a cylinder head, clean them with solvent before the inspection and measuring. And then, blow them with compressed air, and dry them well.
- Engine oil for lubricating the camshaft will be supplied through the oil passage in the cylinder head. Clean the oil passage before assembling the cylinder head.
- After the disassembly of hardware, put a mark on the hardware so they can be reinstalled correctly to their original position.

Reference Value List for Cylinder Head Maintenance

Items	Standard	Service Limit	Remarks
Valve clearance (intake)	0.05~0.08mm (when cold)	—	
(exhaust)	0.05~0.08mm (when cold)	—	
Cylinder head distortion	—	0.05mm	Replace
Inside diameter of valve rocker arm	10.000~10.015mm	10.05mm	Replace
Outside diameter of rocker arm shaft (intake / exhaust)	98078~9.995mm	9.95mm	Replace
Clearance between a rocker arm and a shaft	0.013~0.037mm	0.10mm	Replace
Inside diameter of valve guide (intake)	4.500~4.512mm	4.56mm	Replace the guide or the head
(exhaust)	4.500~4.512mm	4.57mm	Replace the guide or the head
Outside diameter of valve stem (intake)	4.475~4.490mm	4.42mm	Replace
(exhaust)	4.460~4.475mm	4.40mm	Replace
Clearance between a valve stem and a guide (intake)	0.01~0.037mm	0.09mm	Replace the guide or the head
(exhaust)	0.025~0.052mm	0.12mm	Replace the guide or the head
Valve Seat contact width (Intake)	0.8~1.0mm	1.5mm	Modify or replace the head
(Exhaust)	1.0~1.2mm	1.7mm	Modify or replace the head
Free length of valve spring (outer)	36.9mm	35.5mm	Replace
(inner)	33.59mm	32mm	Replace

○Special tool : Valve spring compressor set of Item No. 00-01-1005

○Torque unit

1 kgf • m = 9.80665 N • m (=newton meter)

(M0-0IL) ○This mark shows molybdenum solution.

This solution is a mixture of molybdenum grease and engine oil (in the ratio of 1:1).

∴ Apply molybdenum solution or assembly paste to the portions where it is indicated that molybdenum solution needs to be applied.

(NEW) ○This mark shows those parts to be replaced with every overhaul.
Do not fail to replace these parts every time they are overhauled.

(AL-SPL) ○This mark means Alumi Special (heat-resistant lubricating agent).

• Alumi Special = heat-resistant lubricating paste and grease which prevent galling from high temperatures and heavy loading, and adhesion.

(Purpose: good for those parts which get hot like a spark plug and exhaust manifold.)

☆ Never apply this to any parts other than the specified parts.

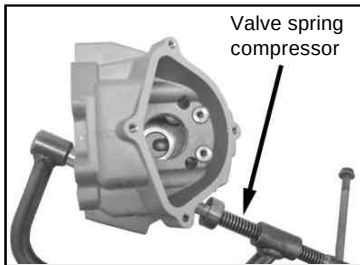
Owner's Manual

● Splitting of Valve

- Compress the valve spring, using a valve spring compressor.

⚠ NOTE : Never compress it more than necessary.

- Special tool: Valve spring compressor set of item No. 00-01-1005

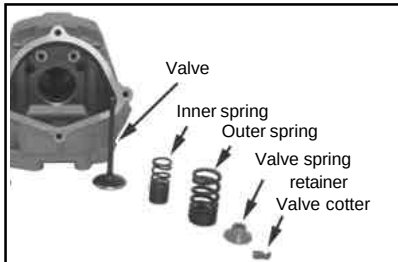


• Removal of Valve Cotter

Use a magnet to remove the cotter if it does not come off easily.

- Remove first the valve spring compressor, and then the following parts:

- Valve spring retainer
- Valve spring (Inner & Outer)
- Valve



⚠ NOTE : If the valve is damaged at its end, do not remove it forcibly, but rectify the end first before removing it.

Check each valve for bending, baking, and damages.

- Measure the exterior diameter of the valve stem at the sliding surface of the guide with a micrometer.
Service Limit IN : 4.42 mm
EX: 4.40 mm

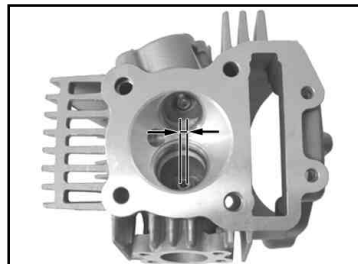
Replace the bent, baked or damaged valves with new ones.



Inspection of the Valve Guide.

- Measure the inner diameter of the valve guide.
Service Limit IN : 4.56 mm
EX: 4.57 mm

Replace the valve guide or cylinder head if the valve guide is scratched or damaged.



Outer diameter of the valve stem subtracted from the inner diameter of valve guide is a guide clearance.

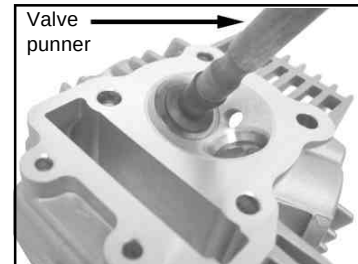
- Service Limit IN : 0.09 mm
EX: 0.12 mm

Inspection of Valve Seat

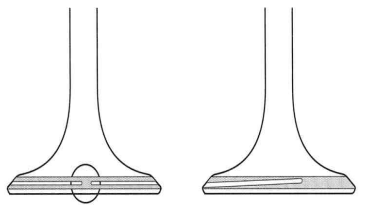
- Remove carbon sediment in the cylinder head combustion chamber and valve.
- Dissolve red lead primer with oil or the like, and apply it to the valve face evenly.



- Tap the valve once and lightly with a valve punner, and rotate it.
- Wipe off the red lead primer on the valve faces, and tap the valves once and lightly with the valve punner without rotating them, and check the contact surfaces for damages or scratches.

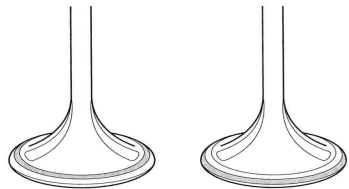


Owner's Manual



Scratch on the seat

Uneven seat width



Contacting at a low position

Contacting at a high position



Service Limit:

Need to be fixed when the service limit at IN is more than 1.5 mm and when the service limit at EX is more than 1.7 mm.

- If there is a scratch on the valve seat, modify the seat.
- If the contact width is wide, narrow, in a high or low position, modify the seat.
- Ask a specialist shop in internal combustion or TAKEGAWA for the modification work.

Inspection of Rocker Arm:

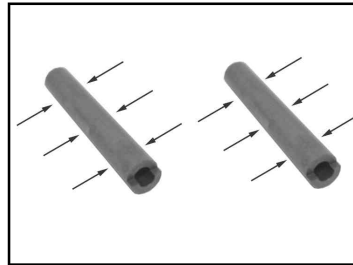
- Check the rocker arms for scratches, damages and jamming. And check if the bearing rotates smoothly.
- Measure the internal diameter of the rocker arms.
- Unfasten an adjust bolt, and check it for scratches. If it is scratched, change it with a new one.



Service limit : If the inner diameter is bigger than 10.05 mm, replace the rocker arm.

Inspection of Rocker Arm Shaft

- Check the rocker arm shaft for bending, scratches, and damages.
- Measure the external diameter of the rocker arm shaft.
 - ∴ Service limit : If the external diameter is smaller than 9.95 mm, replace it.

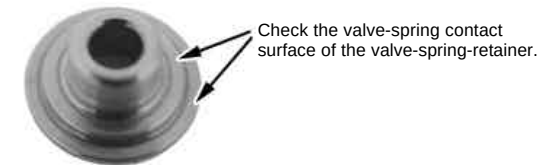


Outer diameter of the rocker arm shaft subtracted from the inner diameter of rocker arm is a clearance.

- ∴ Service limit : If the clearance is bigger than 0.1 mm, replace the rocker arm shaft.

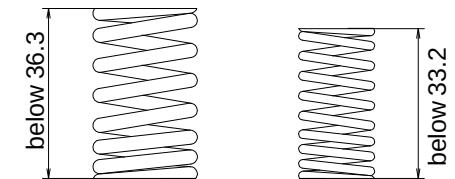
Inspection of Valve Spring Retainer

- Check the valve-spring contact surface of the valve spring retainer for the peeling or damage.
- If they are damaged, be sure to replace them with new ones.



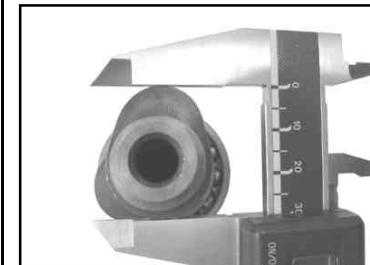
Inspection of Valve Spring

- Check the valve springs for scratches and damages.
- Measure the free length of the valve springs.
 - ∴ Outer : If the length is below 36.3, replace them.
 - Inner : If the length is below 33.2, replace them.



Inspection of Camshaft

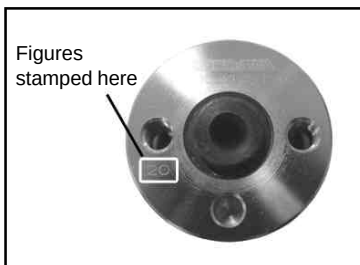
- Check the camshaft for scratches, cracks, and damages.
- Measure the height of each cam lobe.



Owner's Manual

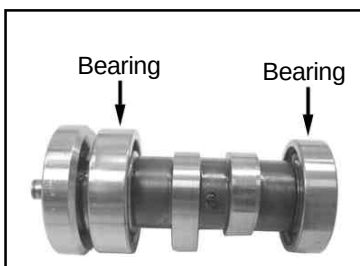
Type of camshafts	Intake	Exhaust	
S-15 cam shaft	below 28.87	below 28.87	Replace
S-20 cam shaft	below 29.05	below 29.05	Replace
S-25 cam shaft	below 29.3	below 29.0	Replace

• A type of the camshaft is stamped on the cam flange.



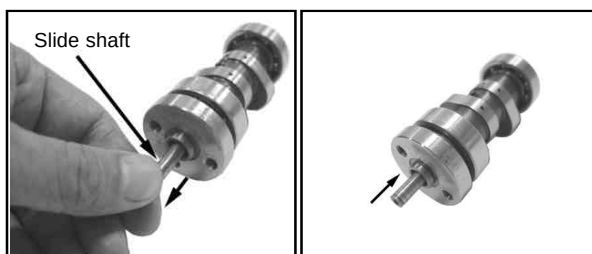
Inspection of the Camshaft Bearing

- Rotate the outer race of the bearings with fingers.
If the outer race does not rotate smoothly or if it is rickety, replace either the ball bearing or cam shaft.

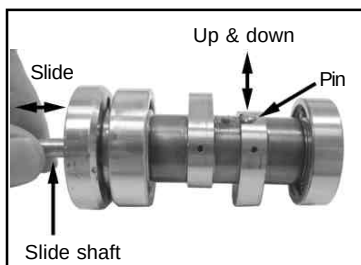


• In the case of automatic decompression camshaft:

Pull the slide shaft of the camshaft center.
And compress the spring in the shaft, and release the shaft. Then, check if the slide shaft slides smoothly and slides back to its original position.
If the slide shaft does not slide smoothly or the tension is not on the spring of the slide shaft, change the camshaft.

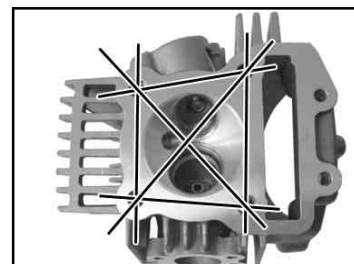


- Slide the slide shaft, and check if the decompression pin moves up and down on the EX side cam.
If the pin does not move up and down when you slide the shaft, or the shaft does not slide because it has become stuck, then change the cam shaft.



Inspection of Cylinder Head

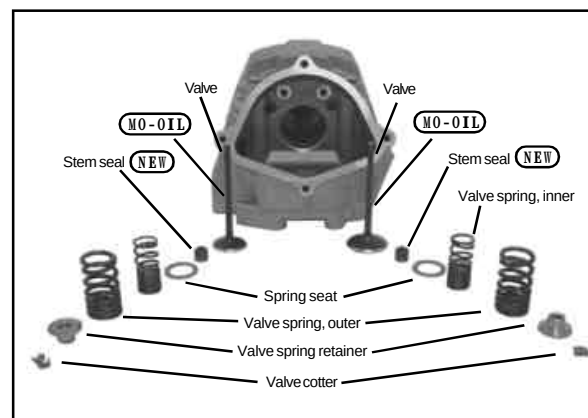
- Check the spark plug hole and valve hole for the cracks in the vicinity.
Check the cylinder head for distortion with a straight edge and thickness gauge.



Service limit: If the distortion is over 0.05 mm, rectify or replace the cylinder head.

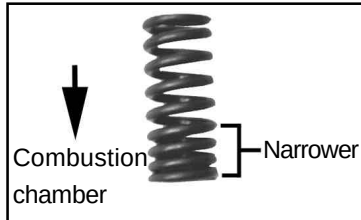
● Valve Assembly:

- Install valve spring seats and new valve stem seals.
- Apply molybdenum solution to the sliding surfaces of the valve stems, and fit the valves into the valve guides, rotating valves slowly with care not to damage the stem seals.



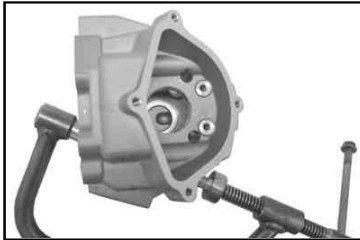
Owner's Manual

- To the head, attach the valve spring, with a narrowly-pitch side pointing to the combustion chamber.



- Compress the valve spring with a valve spring compressor. And apply a thin coat of grease to valve cotters, and install them.

⚠ CAUTION : Do not compress the valve spring more than necessary.



- Tap lightly the end of valve stems a few times so the valves and cotters fit together well.

⚠ CAUTION : Be careful not to damage the valves.

